Konvertering af en 2D AutoCAD model til en 3D konfigurerbar assembly for en Træningspavillon

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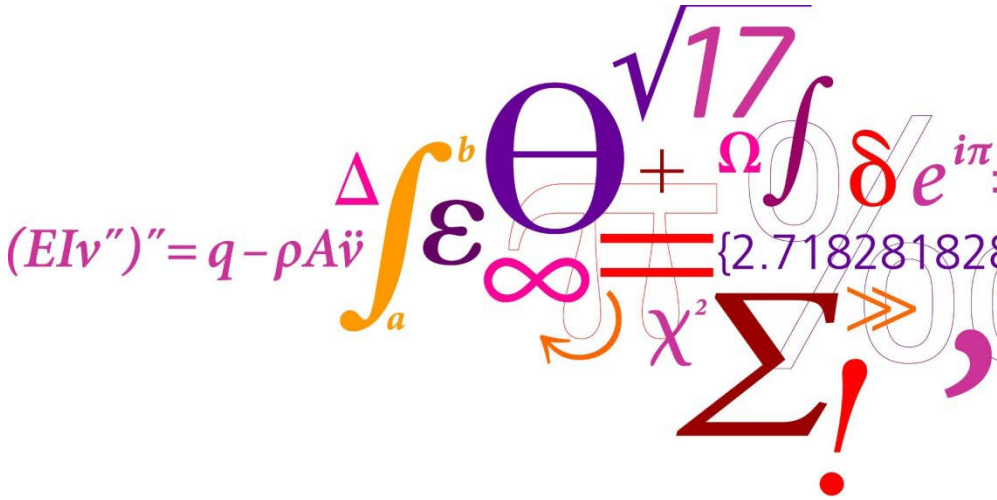
Konstruktion & Produktudvikling
Bygning 426 B



DTU Mekanik
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Disposition

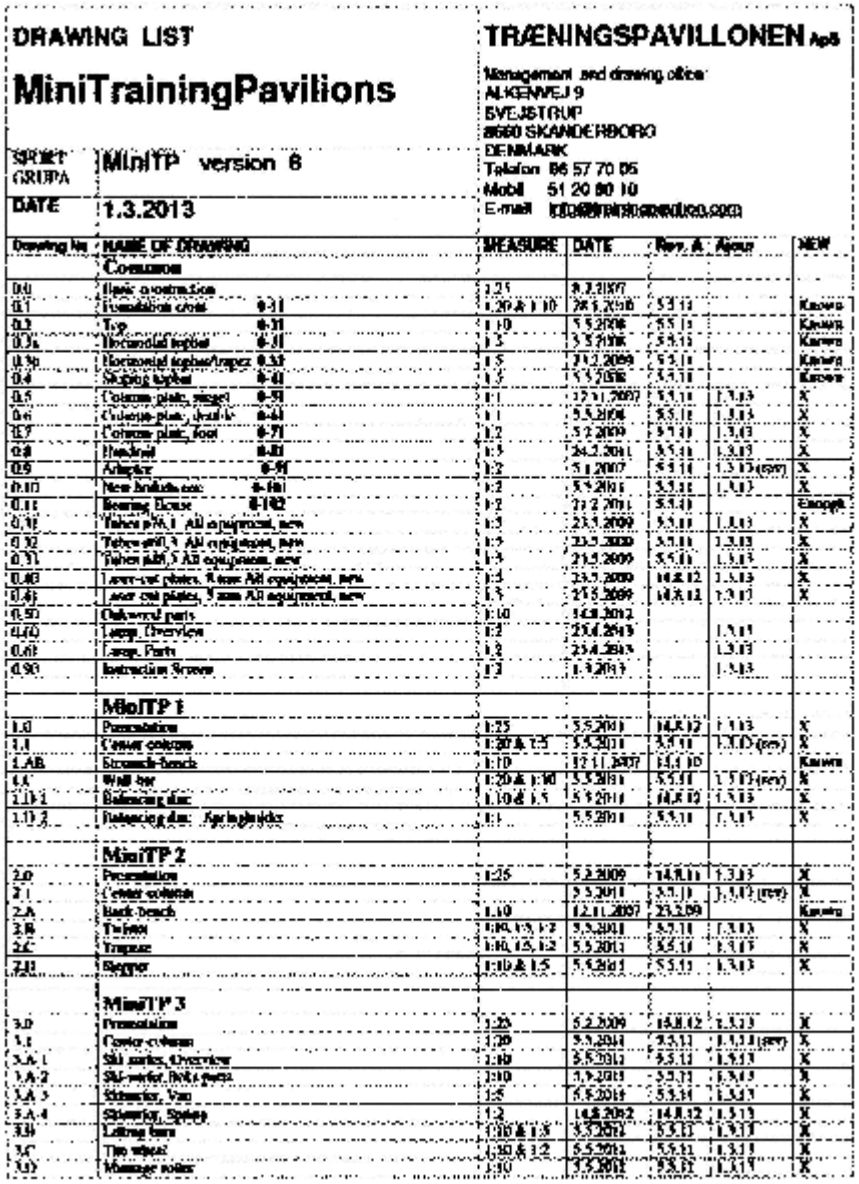
1) Baggrund for arbejdet
2) Indledende analyse og forenklinger
3) Den givne struktur
4) Opbygning af en configurable model
5) De ønskede modeller og nye muligheder
7) Demonstration og eksemplarisk tutorial for motor og akseltyper
8) Konklusion

9) Referencer

Videregående CAD 41617

- Firma ønsker om nye pavillon-varianter
- Ingen firma kompetence til stede for opdatering/ skabelse af variant program
- Uoverskueligt tegningsmateriale lavet i 2D AutoCAD (42 stk. A3 tegninger)
- Ingen firmakompetence vedr. styrkeforhold under ”fremmede himmelstrøg”
- =>
- DTU Projekt med 3-studerende:
- - samarbejde med: Træningspavillonen

Oversigt over
Det ”uoverskuelige”
2D tegningsmateriale
Lavet i 2D Autocad



DRAWING LIST

MiniTrainingPavilions

TRÆNINGSPAVILLONEN ApS

Management and drawing office
ALKENVEJ 9
SVEJSTRUP
9690 SKANDERBORG
DENMARK
Telefon 86 57 70 05
Mobil 51 20 80 10
E-mail [illegible]

SPROG / GRUPPA: MiniTP version 6

DATE: 1.3.2013

Drawing No.	NAME OF Drawing	MEASURE	DATE	Rev. A	Ajour	NEW
	Common					
0.0	Basic construction	1:25	9.2.2007			
0.1	Foundation cross 0-11	1:20 & 1:10	28.1.2010	5.5.11		Kasvo
0.2	Top 0-21	1:10	5.5.2010	5.5.11		Kasvo
0.2a	Horizontal tophat 0-21	1:2	3.5.2010	5.5.11		Kasvo
0.3b	Horizontal tophat/trapez 0-33	1:5	21.2.2009	5.5.11		Kasvo
0.4	Sloping tophat 0-41	1:5	3.5.2010	5.5.11		Kasvo
0.5	Column plate, straight 0-51	1:1	12.11.2007	5.5.11	1.3.13	X
0.6	Column plate, double 0-61	1:1	5.5.2010	5.5.11	1.3.13	X
0.7	Column plate, foot 0-71	1:2	5.2.2009	5.5.11	1.3.13	X
0.8	Handrail 0-81	1:5	24.2.2011	5.5.11	1.3.13	X
0.9	Adapter 0-91	1:2	5.1.2007	5.5.11	1.3.13 (new)	X
0.10	New knuckle 0-101	1:2	5.5.2011	5.5.11	1.3.13	X
0.11	Bearing House 0-102	1:2	21.2.2011	5.5.11		Ekspgit
0.31	Tubes pl01_1 All equipment, new	1:5	23.5.2009	5.5.11	1.3.13	X
0.32	Tubes pl01_2 All equipment, new	1:5	23.5.2009	5.5.11	1.3.13	X
0.33	Tubes pl01_3 All equipment, new	1:5	23.5.2009	5.5.11	1.3.13	X
0.40	Laser cut plates, 8 mm All equipment, new	1:5	23.5.2009	14.8.12	1.3.13	X
0.41	Laser cut plates, 5 mm All equipment, new	1:5	23.5.2009	14.8.12	1.3.13	X
0.50	Oakwood parts	1:10	14.8.2012			
0.60	Large, Overview	1:2	23.4.2013		1.3.13	
0.61	Large, Parts	1:2	23.4.2013		1.3.13	
0.90	Instruction Screw	1:1	1.3.2013		1.3.13	
	MiniTP 1					
1.0	Presentation	1:25	5.5.2011	14.8.12	1.3.13	X
1.1	Cover column	1:20 & 1:5	5.5.2011	5.5.11	1.3.13 (rev)	X
1.AB	Strandt-bench	1:10	12.11.2007	14.4.10		Kasvo
1.C	Wall bar	1:20 & 1:10	5.5.2011	5.5.11	1.3.13 (rev)	X
1.D-1	Balancing dia:	1:10 & 1:5	5.5.2011	14.8.12	1.3.13	X
1.D-2	Balancing dia: Apringbuilder	1:1	5.5.2011	5.5.11	1.3.13	X
	MiniTP 2					
2.0	Presentation	1:25	5.2.2009	14.8.11	1.3.13	X
2.1	Cover column		5.5.2011	5.5.11	1.3.13 (rev)	X
2.A	Back bench	1:10	12.11.2007	23.2.09		Kasvo
2.B	Twists	1:10, 1:5, 1:2	5.5.2011	5.5.11	1.3.13	X
2.C	Trapeze	1:10, 1:5, 1:2	5.5.2011	5.5.11	1.3.13	X
2.D	Rigger	1:10 & 1:5	5.5.2011	5.5.11	1.3.13	X
	MiniTP 3					
3.0	Presentation	1:25	5.2.2009	14.8.12	1.3.13	X
3.1	Cover column	1:20	5.5.2011	5.5.11	1.3.13 (rev)	X
3.A-1	Ski swing, Overview	1:10	5.5.2011	5.5.11	1.3.13	X
3.A-2	Ski swing, Back swing	1:10	5.5.2011	5.5.11	1.3.13	X
3.A-3	Skiswing, Van	1:5	5.5.2011	5.5.11	1.3.13	X
3.A-4	Skiswing, Spider	1:2	14.8.2012	14.8.12	1.3.13	X
3.B	Lifting bars	1:10 & 1:5	5.5.2011	5.5.11	1.3.13	X
3.C	Tire wheel	1:10 & 1:2	5.5.2011	5.5.11	1.3.13	X
3.D	Massage roller	1:10	5.5.2011	5.5.11	1.3.13	X

som de så ser ud i virkeligheden

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Struktur

- Overskuelighed over nye løsninger og deres realiserbarhed ønskes
- simpel ”juletræsmodel”
- tilvalgene foretages som subassemblies, som indeholder parterne for det pågældende valg
- ingen lange kæder af referencer
- samme type fastgørelse anvendes ved forskelligt grej, som monteres på samme lokation
- Dog vil hullerne i centalsøjlen afhænge af det valgte tilbehør og dets tilstedeværelse

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Demo Pavillon

CAD modellen

TP_1

TP_2

TP_3

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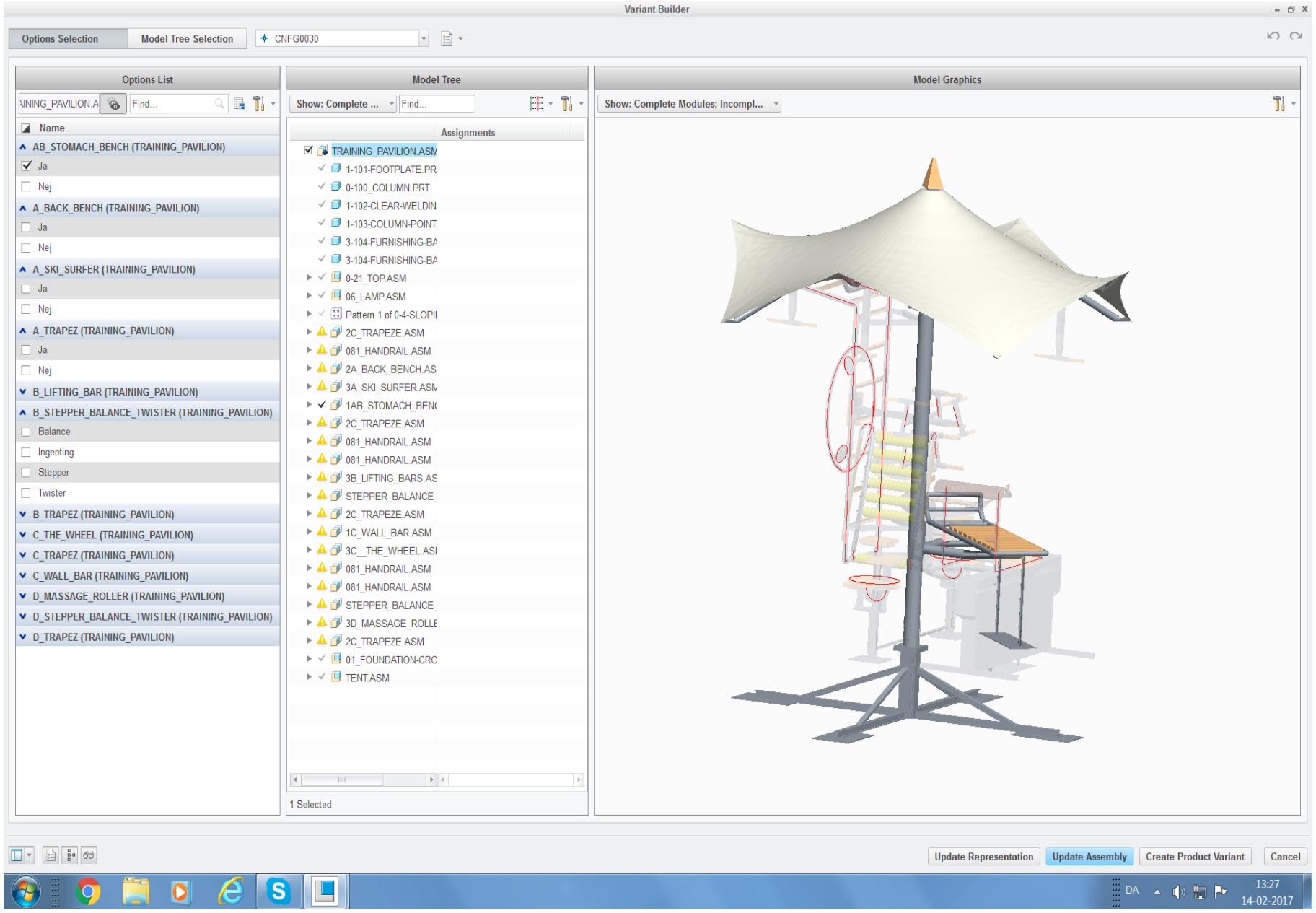
How does it work

Opstart:
Overkonfigureret assembly

Variant Builder



At bemærke !

- Fra hvert Configurable module skal mindst én valgmulighed til vælges. Dette betyder, at hvis ”styrhjul” ikke til vælges må udvælges en ”dummy” part, som har de samme assembly contraints som ”styrhjulet”. Denne dummy part ses så i assemblyen.
- I det konkrete eksempel laves dummier (propper), som forsøgsvis tildækker de ikke længere ønskværdige huller i den lodrette centrale montagestang.
- Alternativt anvendes en fællesmængde, som så i varianter udberedes fra fællesmængden

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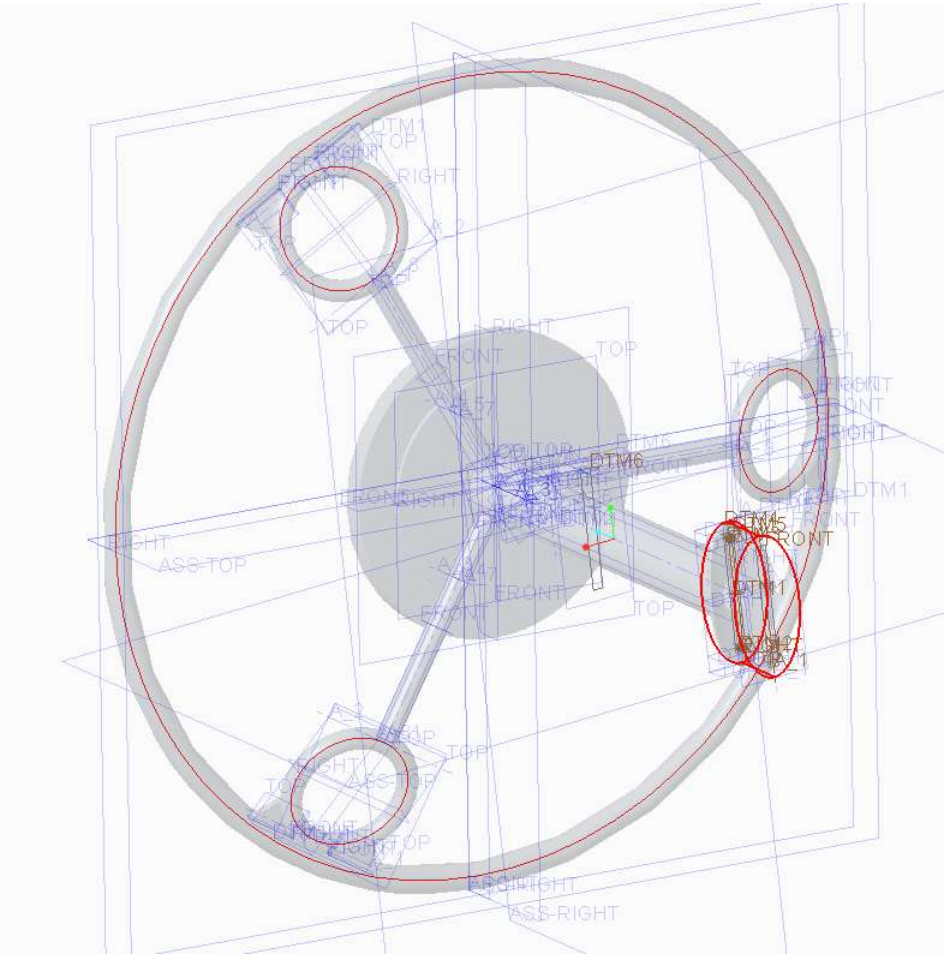
Dummy part, som erstatter håndhjulet, når det ikke anvendes



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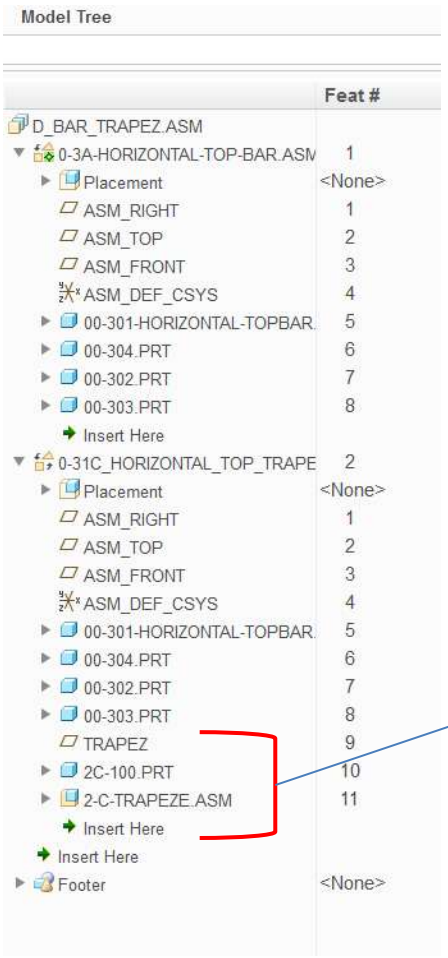
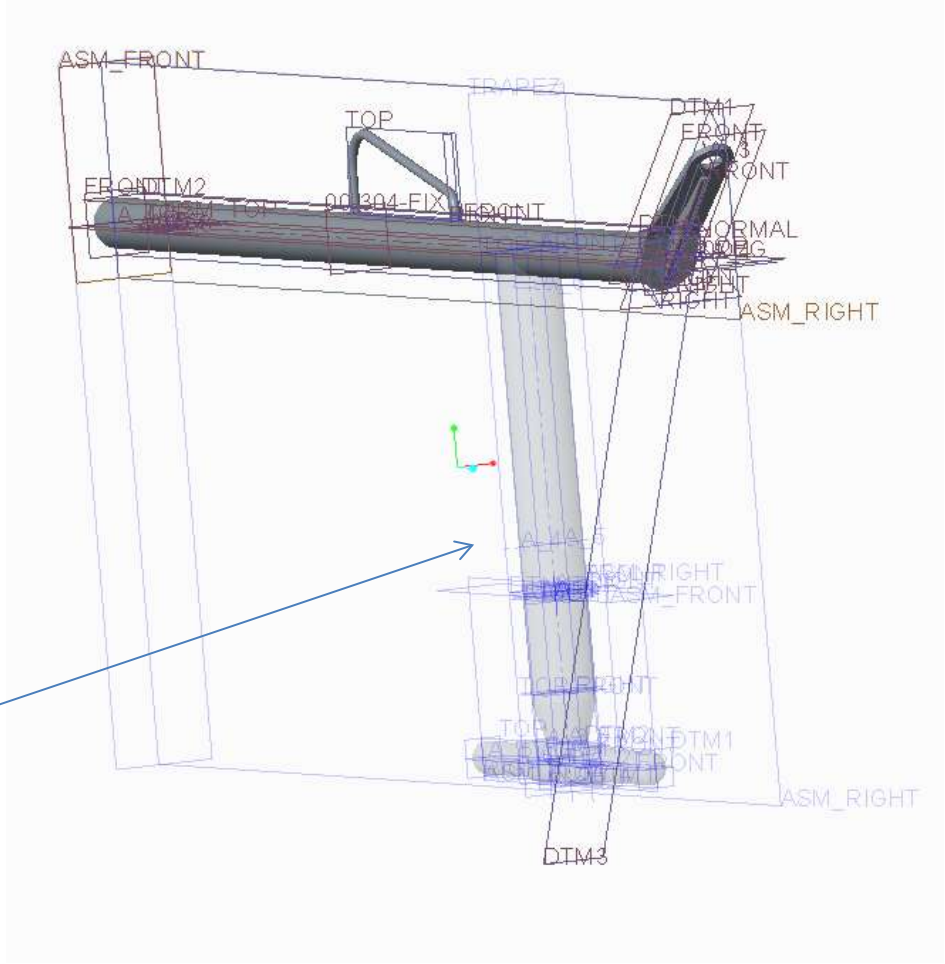
Configurationer med ”fællesmængde”





Tutorial og demo !

- En motor med forskellige aksel typer

Referencer.

- www.TrainingPavilion.com,, ref: Christian Hage
- Jesper Alkestrup, Kai Paludan-Müller og Kristian Ø. Lund: ”Fra tekniske tegninger, til fleksiblel CAD-modeller”, Kursus 41617 - Videregående CAD, DTU.
- Georg K. Christensen: ”Exercise in Configurable Products using Creo parametric”, i øvelser for Kursus 41617 Videregående CAD, DTU.

Product Development Symposium 2017

TECHNICAL UNIVERSITY OF DENMARK

7th-10th November

DTU

Product Development Symposium 2017

The Product Development Symposium is an opportunity designed for industry delegates to gain insight into advances in engineering design & product development research and practice. The symposium is organised into four topic focused days of strategic importance to Danish manufacturing and product development.

PRODUCT ARCHITECTURE DAY

7th Nov

PRODUCT ARCHITECTURES November 7th

Product Architecture Day

Product Architecture strategies can significantly reduce time to market and time to money. However, successful implementation requires a departure from the current ways of working! The day aims to consolidate state of the art practice.

- Product Architecture modelling
- Complexity-cost calculation
- Modular Product Development
- PLM support

ROBUST DESIGN DAY

8th Nov

ROBUST DESIGN November 8th

Robust Design Day

The benefits of robust design are widely accepted, however, the gap between theory and practice remains. The Robust Design Day focuses on applied Robust D[illegible] and Variation Management, consist[illegible] guest lectures and a workshop.

- Robust Design Methodology
- Process Capable Design
- Tolerance & Quality Engineering
- Kinematics & Exact Constraints

PRODUCT/ SERVICE-SYSTEMS DAY

9th No[illegible]

Produ[illegible]/Service - [illegible]y[illegible]s Day

[illegible]e shift from selling products to providing Product/Service-Systems (PSS) drives new business opportunities and sustainability improvement. This day focuses on current trends in PSS as promising solutions.

- Servitisation
- PSS configurations
- PSS innovation
- PSS sustainability Assessment

CONCEPTUALIZING SUSTAINABLE FUTURES DAY

10th Nov

SUSTAINABLE FUTURES November 10th

Conceptualizing Sustainable Futures Day

Environmental & resource constraints require radical changes to our engineered systems. Conceptualisation of Sustainable Futures (CSF) aims to understand the challenges and set out new sustainable solutions to address them.

- Technological transformations
- Policies for sustainable development
- Sustainable systems design
- Managing the transition

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